

REFERENCE 20

**Track 1 Risk Evaluation for Industrial Waste Lift Station,
2/23/93**



February 23, 1993

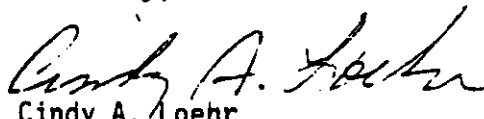
Mr. Edward Kennedy
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Idaho Falls, ID 83403-2528

TRACK 1 RISK EVALUATION FOR INDUSTRIAL WASTE LIFT STATION - CAL-7-93

Dear Mr. Kennedy:

Attached is the Track 1 risk evaluation for the Argonne National Laboratory-West Industrial Waste Lift Station per your request of Robert L. Nitschke on February 17, 1993. If you have any questions, please do not hesitate to call me at 526-9202.

Sincerely,


Cindy A. Loehr
Chemical & Radiological
Risk Assessment

td

Attachment:
As Stated

cc: R. L. Nitschke, MS 3960
Central Files, MS 1651
C. A. Loehr File

TRACK 1 RISK EVALUATION SUMMARY ANL-W INDUSTRIAL WASTE LIFT STATION

A Track 1 risk assessment was conducted to establish risk-based soil screening concentrations for an Argonne National Laboratory-West (ANL-W) Track 1 unit called the Industrial Waste Lift Station. Track 1 risk assessment guidance¹, which provides methodology for assessment of low probability hazard sites at the INEL, is used for the evaluation. The single contaminant evaluated at the site is silver.

Exposure Scenarios and Pathways

The exposure scenarios considered are 25 years for an occupational worker at the site in the current time frame and a 30 year resident at the site. Four potential exposure pathways are considered as applicable: soil ingestion, inhalation of fugitive dust, inhalation of volatiles, and groundwater ingestion. For the groundwater pathway, which is considered for the residential scenario, no time constraints apply; peak groundwater concentrations are used for estimating associated risk-based soil screening concentrations.

Toxicity and Exposure Assessment Parameters

The calculation of soil screening concentrations is based on a target hazard quotient of 1.0 (based on noncarcinogenic effects, since silver is not classifiable as to human carcinogenicity). EPA-approved reference doses used in the evaluation are from the EPA on-line database IRIS. No credit is taken for chemical degradation in determining the risk-based soil concentrations. The toxicity values and physical properties used in this study are provided in Table 1. Site dimensions used in the risk assessment are 2.4 m x 2.4 m with a 4.9 m depth of contamination.

Groundwater transport parameters used for determining risk-based soil concentrations for the groundwater ingestion pathway, given in Table 2, are those specified in Reference 1 unless otherwise noted. A conservative estimate for solubility is used. Version 1.5 of the code GWSCREEN² is used for groundwater calculations.

Risk-Based Soil Concentrations

Risk-based soil screening concentrations for silver are given in Table 3. The concentrations are given for the exposure pathways considered for both an occupational scenario and a residential

Table 1. Contaminant-specific factors used in risk assessment.

Contaminant	SF Oral (per mg/kg/day)	RfD Oral (mg/kg /day)	SF Inhalation (per mg/kg/day)	RfD Inhalation (mg/kg /day)	Kd (cu.cm/g)
Silver		5.00E-03			9.00E+01

SF = Slope Factor
RfD = Reference Dose
Kd= Soil-water partition coefficient, from INEL Track 1 risk assessment guidance.

Table 2. Groundwater transport inputs used for groundwater ingestion risk-based soil concentration calculations.

Aquifer:	
Pore velocity	570 m/y ^a
Longitudinal dispersivity	1E-03 m
Transverse dispersivity	5E-04 m
Length of well screen	15 m
Dry bulk density	1.9 g/ml
Porosity	0.1
Kd	90
Unsaturated zone:	
Net infiltration	1 m/y
Volumetric water content	0.09
Dry bulk density	1.9 g/ml
Depth to groundwater (1/3 actual)	63.4 m
Kd	90
Soil zone:	
Soil density	1.5 g/ml
Volumetric water content	0.35
Length of source parallel to flow	2.4 m
Width of source perpendicular to flow	2.4 m
Thickness of contaminated zone	4.9 m
Solubility limit	1E6 mg/L
Kd	90
Receptor distance downgradient	0 m
Receptor distance perpendicular to flow	0 m

a. Obtained from *Track 2 Sites: Guidance for Assessing Low Probability Hazard Sites at INEL*. DOE/ID-10389, Revision 3, July 1992.

Table 3. Screening criteria summary table.

Site: Argonne Industrial Waste Lift Station

Contaminant	Occupational Scenario					
	Soil Ingestion		Inhalation of Dust		Inhalation of Volatiles	
	SC at 1E-06 risk	SC at 1E-06 risk from radionuclides	SC at 1E-06 risk	SC at 1E-06 risk from radionuclides	SC at 1E-06 risk HQ=1	SC at 1E-06 risk
Silver	1.00E+04	NA		NA	NA	NA

NA = Not applicable

HQ = Hazard quotient

SC = Soil concentration

Note: Concentrations given in mg/kg for nonradioactive contaminants and in pCi/g for radioactive contaminants.
Where concentration is blank, no approved toxicity values exist.

REFERENCES

1. DOE, *Track 1 Sites: Guidance for Assessing Low Probability Hazard Sites at INEL*, DOE/ID-10340(92), Revision 1, July 1992.
2. A.S. Rood, *GWSCREEN: A Semi- Analytical Model for Assessment of the Groundwater Pathway from Surface or Buried Contamination: Theory and User's Manual*, EGG-GEO-10158, March 1992.